



Forensics Source
13386 International Parkway
Jacksonville, Florida 32218
Tel. 800-347-1200
Fax: 800-366-1669
www.forensicsource.com

Crystal Violet

TECHNICAL NOTES

Background

Crystal violet is also known under the name of gentian violet. It is a protein dye which stains the fatty portions of sebaceous sweat a deep purple color. Being a protein dye, crystal violet dye can also be used as an enhancer for bloody fingerprints. However, if this dye solution is going to be used on bloody prints, the first method shown here is recommended. Crystal violet dye is also used on most types of adhesive tapes, because conventional powders adhere to the entire sticky side of the tape and are not selective to the latent prints.

The crystal violet powder is dissolved into a liquid solution. It can be used to visualize latent prints on the adhesive side of all types of tapes, i.e., duct tape, Scotch tape, masking tape, black electrical tape, etc. Another method of tape staining, Coomassie brilliant blue cannot be used on all types of tapes, i.e., Scotch tape, as it dissolves the tape.

Safety

As with all chemicals, always read the MSDS (material safety data sheet) to learn about the safe handling and health hazards of each chemical. It is suggested to experiment on non-evidence items to become familiar with this process. Wear gloves when using this solution to avoid stains on the hands. If using the Method Two solution, use caution in handling ethyl alcohol, as it is flammable and poisonous, and hydrochloric acid is corrosive. Wear goggles, gloves and protective clothing, and work with these chemicals near an eye wash station and/or an emergency shower. Be careful not to spill the solution on clothing, the floor or on a counter, as it is very difficult to clean up.

Mixing Instructions – Method One

Add 0.1 gram of crystal violet to 100 milliliters of distilled water. The pH of the water used is of some importance. It should be checked with litmus or test paper to have a pH of 7-8. The pH of the water can be adjusted accordingly using ammonia.

Mixing Instructions – Method Two

Stock Solution: Mix 1.5 grams crystal violet in 100 ml ethyl alcohol.

Working Solution: Dilute 2 ml of the crystal violet stock solution in 100 ml of tap water.

Clearing Solution: To 90 ml of tap water, add 10 ml of hydrochloric acid.

NEVER ADD THE WATER TO THE ACID.

Application

Both Mixing Methods: For processing pieces of tape, place the mixed solution into a tray long enough to hold the piece of tape. If none is available, the tape can be dipped back and forth through the solution in the tray. The tray can be metal, glass or plastic. The solution may dye the trays after a number of uses. To avoid contamination, a specific tray should be dedicated for this use and not used for other chemicals. Disposable aluminum trays can also be used and discarded after they are stained. These aluminum trays (like the kind used for baking) can be purchased at a grocery store or a variety store.

Soak the tape in the solution for a few minutes. Rinse the tape under running water to wash away the excess dye. Any prints may be visible from dark to light contrast. If the latent prints are faint, soak the tape again in the dye solution for a few more minutes. Rinse the tape under running tap water again and examine the contrast of the latent prints. This can be repeated several times, but use caution to not overdevelop the latent prints.

Mixing Method Two: If the latent prints are overdeveloped, the tape can be placed in the clearing solution until a better contrast is obtained. This method is a bit more dangerous due to the hazardous nature of the additional chemicals used.

Fluorescence Examination

If contrast between the latent prints and the background is not sufficient for adequate photography, a forensic light source can be used to obtain improved contrast via fluorescence. If fluorescent examination is going to be done, it is recommended to dry the tape with the crystal violet-developed latent print for 24 hours at room temperature. If the concentration of the crystal violet is high, there may not be any visible fluorescence. Faintly developed latent prints tend to fluoresce better.

Suggested excitation wavelengths would be 525, 530 and 570 nm and view through red goggles. If using 485 or 450 nm, try using orange goggles. Photograph the fluorescent prints with the same colored camera filter.

Processing Black Electrical Tape

If the tape is black electrical tape, the prints may be difficult to photograph. Another method can be used to recover these latent prints. Prepare a few sheets of black and white RC (resin coated) photographic paper by fixing, washing and drying them. Place the dried tape between two sheets of this paper (or between one sheet folded in half). The adhesive side of the tape must touch the emulsion side of the paper. Heat a regular steam iron to a moderate temperature **below** the steam level and apply it to the photo paper with the tape in between. Carefully pull apart the layers and photograph the transferred latent prints from the photo paper.

PLEASE NOTE: The resulting transferred latent prints will be “reversed” left to right or in “reversed position.” To print the photograph with the latent prints in the correct position, flip over the negative before placing it into the enlarger or placing it against the photo paper in a contact printer.

A method for remembering to turn over these negatives is to include a transparent ruler in the picture. Turn the ruler over and place it facedown next to the latent prints. Take the picture. When printing the negative, print it so the ruler is correct. It will be necessary to turn the negative over in the enlarger to accomplish this. When the ruler shows correctly, the latent prints will also show correctly.

Additional Reading

Fingerprint Detection by Fluorescence Examination by the British Home Office
Manual of Fingerprint Development Techniques by the British Home Office, second edition
Advances in Fingerprint Technology edited by Dr. Henry C. Lee and Dr. R. E. Gaensslen

Ordering Information

Catalog No. 1-2725 Crystal Violet, 25 grams
Catalog No. 6-3814 Transparent 6" Scales, Pack of 10
Catalog No. 8-5039 HOME OFFICE/*Fingerprint Detection by Fluorescence Examination*
Catalog No. 8-5015 HOME OFFICE/*Manual of Fingerprint Development Techniques*, 2ND edition
Catalog No. 8-5041 LEE/*Advances in Fingerprint Technology*